

§2131. "The identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); M.P.E.P. §2131.

The above requirements for anticipation are not met in the rejection of Applicants' claims.

I. ANDREEV ET AL.

Claims 1-3, 5, 6, 11-13, 15 and 16 were rejected under §102(e) as being anticipated by Andreev et al., U.S. Publication No. 2005/091625.

A. **Independent Claims 1 and 11**

Independent claim 1 is directed to a process of positioning megacells that are included in an initial integrated circuit layout that violates design rules. The circuit layout has sides defining sides of a chip. The process includes the steps of "inflating a size of at least some of the megacells;" "placing the megacells in a footprint of the circuit to reduce placement complexity;" and "permuting megacell placement to reduce placement complexity."

Independent claim 11 include similar limitations, which are recited in the context of a computer usable medium.

B. **Inflating a Size of a Megacell is Sufficiently Defined By the Specification.**

Paragraph 33 of the Office Action incorrectly states that, "Applicant[s] do not explicitly state in their [specification] the exact meaning of 'inflating a size'. Inflating a size of a megacell apparently means determining a size of a megacell."

An example of inflating a size is explicitly described on page 6, line 24 to page 7, line 7. The "size" of the megacell is clearly defined as relating to the "dimensions" of the megacell. Also, the act of "inflating" the size (e.g., dimensions) of the megacell is clearly described as increasing the

dimensions of the megacell. For example, the specification states on Page 7, lines 5-7, "[t]he inflation thus forms a larger megacell with dimensions  $m' \times n'$  to provide enough space for wires."

It is therefore inaccurate to state that the specification does not explicitly describe the exact meaning of "inflating a size." Rather, the specification clearly uses these terms in their ordinary meanings. In fact, any dictionary definition of "size" refers to "physical dimensions". "Inflating" is obviously "increasing".

**C. Andreev et al.**

The Andreev et al. disclosure provides a process for placing megacells, such as memories in a chip. As described in paragraph [0043], in some cases the found coordinates may violate certain design rules of the fabrication technology. "In such a case, it may be necessary to subsequently apply tools for legal placement of the megacells that is close to the "most attractive coordinates obtained by the present process."

An embodiment of the present application is directed to legalization of megacell placement and correction of an initial design that violated design rules so that the corrected design satisfies the design rules while maintaining placement that is similar to the initial placement.

Therefore, the procedures of Andreev et al. and the present disclosure can be consecutive steps of a chip design process. The procedures solve significantly different (though complementary) problems.

**1. Andreev et al. Does Not Disclose "Inflating a Size of a Megacell"**

Paragraph 34 of the Office Action incorrectly states that Andreev anticipates determining a cell size in paragraph [0002], lines 3-7 and paragraph [0003], lines 10-13.

These paragraphs simply state that the customer selects

the size of the chip that meets the customer's requirements of circuit form, fit and function. Selection of the size of an integrated circuit chip (on which cells will be placed) has nothing to do with "inflating a size of a megacell."

Paragraph 4 of the Office Action further cites paragraph [0016], lines 1-4 of Andreev et al. This paragraph refers to the flow chart shown in FIG. 1, which does not disclose a step of inflating a size of a megacell.

The cited paragraphs clearly do not anticipate this element of claims 1 and 11 and therefor do not support the rejection.

## 2. **Permuting to Reduce Placement Complexity**

Andreev et al. move cells in order to minimize delay of certain critical paths and to obtain uniform distribution of the cells. Andreev et al. do not disclose permuting megacell placement to reduce placement complexity.

### D. **Dependent Claims**

#### 1. Claims 2 and 12

With respect to claim 2 (and similarly claim 12), Andreev does not disclose "identifying a distance between an edge of the megacell in each side of the chip;" "Identifying a distance between a center of the megacell and a center of another megacell of the first type;" or "applying an inflation factor to the sides of the megacell."

The paragraphs of Andreev et al. that were cited in the Office Action provide no support for these rejections.

For example, FIG. 3 relates to evaluation of wires placed between pins that are connected to this wire. The cited steps of FIG. 4 relate to definition of a rectangle on the chip within which the free area (an area not containing a cell) is calculated. This has nothing to do with inflating the size of a megacell or identifying distances between edges of a megacell and the sides of a chip or between centers of megacells. The cited

passages are completely irrelevant to the elements of the Applicants' claims.

2. Claims 3 and 13

With respect to claim 3 (and similarly claim 13), Andreev et al. do not disclose calculation of an "inflation factor" or calculation of an inflation factor by "identifying a number of pins in each half of the megacell in each of two orthogonal directions." FIG. 3 of Andreev et al. does not anticipate this element.

Andreev et al. also do not disclose "for each direction, at least in part basing the inflation factor for sides of the megacell in the respective direction on the number of pins in both halves of the megacell."

Again, the citations provided in the Office Action provide no support for these limitations.

3. Claims 4 and 14

With respect to claim 4 (and similarly claim 14), this claim further defines calculation of the inflation factor. Again, Andreev et al. do not disclose an inflation factor or the calculation recited in claim 4.

4. Claims 5-10 and 15-20

Claims 5-10 (and 15-20) relate to the step of permuting megacell placement to reduce placement complexity.

As described in the previous response, Andreev et al. do not permute megacell placements to reduce placement complexity. Rather, cells are moved (new cell coordinates are calculated) in order to minimize delay and to obtain uniform distribution of cells.

Since Andreev et al. do not anticipate each and every element of the rejected claims, Applicants respectfully request that the rejection under §102(e) be withdrawn.

II. HOSSAIN ET AL.

Claims 1-20 were rejected under §103(a) as being

unpatentable over Hossain et al., U.S. Patent No. 6,014,506 in view of Applicant's Admitted Prior Art.

**A. Inflating a Size of a Megacell**

Hossain et al. does not disclose "inflating a size of at least some of the megacells," as recited in claim 1 (or similarly claim 11).

As described in the previous response, the Office Action directs Applicants' attention to Hossain et al., column 6, lines 32-37 and 60-67. A person of ordinary skill in the art could easily see that the notions of a "target window" of Hossain et al. and "megacell size inflation" are completely different. The target window of Hossain et al. is defined as a region on the layout area in which cells can be placed. There is nothing in these cited passages that would teach or suggest inflation of the size of at least some of the megacells, as recited in claim 1 of the present application.

Further, Hossain et al. do not disclose permuting megacell placements to reduce complexity. Rather, placement is modified to improve timing.

**B. "Megacell"**

The Office Action acknowledges that Hossein et al. do not disclose the term "megacell", but uses cells, modules and "bigger cells". The cited AAPA uses the term "megacell".

The Hossain et al. disclosure solves an Engineering Change Order (ECO) problem. (Column 2, lines 47-48). After placement, if some of the constraints, such as timing requirements, are not met the designer may change the netlist by adding some new cells (i.e., components) into the netlist or by replacing some of the existing cells by, typically, bigger cells. (Column 2, lines 39-43). It is well known in the art that timing can be improved by replacing one cell with a similar, "bigger cell" having a greater drive strength.

A person having ordinary skill in the art would easily

understand that the term "bigger cell" as used by Hossain et al. has a very different meaning than the term "megacell" in the present application. The term "bigger cell" of Hossain et al. is just a comparative form that means some of the existing cells (possibly small cells) may be replaced by bigger cells. It is likely that these bigger cells are small as well (though they are bigger than the old cells).

C. **Dependent Claims**

1. Claims 2 and 12

With respect to claims 2 and 12, Hossain et al. does not disclose, for each megacell of a first type "identifying a distance between an edge on the megacell and each side of the chip," "identifying a distance between a center of the megacell and a center of another megacell of the first type," or "applying an inflation factor to the sides of the megacell."

Column 6, lines 63-67 relate to a timing constraint that is the maximum allowed delay on a critical path. Cells are placed in such a way that the delay constraints are met. This has nothing to do with identifying a distance between an edge on the megacell and each side of the chip.

Column 6, lines 39-49 related to a "bounding-box" defined as the minimum rectangle enclosing all the pins to which the net is connected. This bounding-box has nothing to do with "identifying a distance between the center of a megacell and the center of another megacell. The "bounding-box" also has nothing to do with applying an inflation factor to the sides of a megacell. Rather, the bounding-box relates to a net.

2. Claims 3 and 13

With respect to claims 3 and 13, the "bounding-box" of Hossain et al. has nothing to do with identifying a number of pins in each half of a megacell in each of two orthogonal directions.

3. Claims 4 and 14

With respect to claims 4 and 14, again, the Office

Action recites column 6, lines 39-49. The cited paragraph is unrelated to an inflation factor and in particular does not disclose the calculation recited in claims 4 and 14.

4. Claims 5-10 and 15-20

With respect to claims 5-10 and 15-20, these claims relate to permuting megacell placements to reduce placement complexity.

Hossain et al. discloses modifying placement to improve timing. There is nothing to teach or suggest permuting megacell placements to reduce placement complexity nor the particular steps recited in claims 5-10 and 15-20.

Since Hossain et al do not teach or suggests each and every element of Applicants' claims, Applicants respectfully request that the rejection of claims 1-20 under §103(a) be withdrawn.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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